

In the Claims: (strikethrough parts deleted and underlined parts added)

1. (Currently Amended) A spray coolant reservoir system, comprising:
a chassis having a spray chamber;
a spray unit within said spray chamber for dispensing coolant upon an item to be thermally managed;
a coolant system including a pump having an intake port and an output port, wherein said output port is fluidly connected to said spray unit ~~and~~ , wherein said intake port of said pump is fluidly connected to said spray chamber, wherein said coolant system provides pressurized coolant to said spray unit;
a reservoir fluidly connected to said output port of said pump ~~said coolant system,~~ wherein said reservoir is capable of storing a volume of coolant; and
a control system in communication with said coolant system and said reservoir for controlling a flow of coolant between said reservoir and said coolant system.
2. (Original) The spray coolant reservoir system of Claim 1, including an intake valve fluidly connected to said coolant system, wherein said intake valve is also fluidly connected to said spray chamber and to said reservoir.
3. (Original) The spray coolant reservoir system of Claim 2, wherein said intake valve diverts coolant input flow to said coolant system from said reservoir when coolant flow from said spray chamber is hindered.
4. (Original) The spray coolant reservoir system of Claim 2, wherein said intake valve allows coolant input flow to said coolant system solely from said spray chamber during normal operation and from said reservoir when coolant flow from said spray chamber is hindered.
5. (Original) The spray coolant reservoir system of Claim 2, wherein said intake valve allows coolant input flow to said coolant system solely from said spray chamber during normal operation and jointly from said reservoir when coolant flow from said spray chamber is hindered.

6. (Currently Amended) The spray coolant reservoir system of Claim 1, including an output valve fluidly connected to said output port of said pump ~~said coolant system~~, wherein said output valve is also fluidly connected to said spray unit and to said reservoir.

7. (Original) The spray coolant reservoir system of Claim 6, wherein said output valve allows coolant output flow solely to said spray unit from said coolant system during normal operation.

8. (Original) The spray coolant reservoir system of Claim 6, wherein said output valve diverts coolant output flow from said coolant system to said reservoir to fill said reservoir.

9. (Original) The spray coolant reservoir system of Claim 1, wherein said reservoir includes a chamber port fluidly connected to spray chamber for selectively allowing pressure equalization.

10. (Original) The spray coolant reservoir system of Claim 1, wherein said reservoir is positioned within said chassis.

11. (Original) The spray coolant reservoir system of Claim 1, wherein said reservoir is positioned external of said chassis.

12. (Original) The spray coolant reservoir system of Claim 1, wherein said reservoir includes a fill port and a drain port.

13. (Original) The spray coolant reservoir system of Claim 1, wherein said reservoir includes a vent port.

14. (Currently Amended) A method of operating a spray coolant reservoir system, said method comprising the steps of:

(a) drawing a first coolant flow from a spray chamber to provide a supply coolant flow to a spray unit positioned within said spray chamber; and

(b) drawing a second coolant flow from a reservoir to provide said supply coolant flow to said spray unit only if said first coolant flow is hindered.

15. (Original) The method of operating a spray coolant reservoir system of Claim 14, wherein step (b) includes terminating said first coolant flow.

16. (Original) The method of operating a spray coolant reservoir system of Claim 14, including diverting said supply coolant flow from said spray unit to said reservoir to fill said reservoir.

17. (Original) A method of controlling pressure within a spray chamber using a reservoir, said method comprising the steps of:

- (a) closing a chamber port fluidly connected between a reservoir and a spray chamber;
- (b) opening a vent port within said reservoir;
- (c) opening an intake valve to said spray chamber if reducing a spray chamber pressure or opening said intake valve to said reservoir if increasing said spray chamber pressure;
- (d) opening an output valve to said reservoir if reducing said spray chamber pressure or opening said output valve to said spray chamber if increasing said spray chamber pressure;
- (e) operating a pump unit fluidly connected between said intake valve and said output valve; and
- (f) terminating said pump unit after said spray chamber pressure attains a desired pressure level.

18. (Original) The method of controlling pressure within a spray chamber using a reservoir of Claim 17, including the following steps:

- (g) closing said vent port; and
- (h) opening said chamber port.

C. APPLICANT'S COMMENTS

Claims 1-18 are pending in this Application with Claims 1, 6, 14 being amended. No new matter is added by way of these amendments, and the amendments are supported throughout the Specification and the drawings. Reconsideration of Claims 1-18 is respectfully requested. The Examiner's rejections will be considered in the order of their occurrence in the Office Action.

Paragraphs 1-2 of the Office Action

A. Overview.

The Official Action rejected as-filed Claims 1, 10, 11 and 14 under 35 U.S.C. §102(b) as being anticipated by Przilas (U.S. Patent No. 5,907,473). The Applicant respectfully disagrees with this rejection for at least the following reasons.

B. 35 U.S.C. §102(b).

It is important to first briefly discuss 35 U.S.C. §102 and its application to the present application. Under 35 U.S.C. §102(b), anticipation requires that the prior art reference both (1) disclose, either expressly or under the principles of inherency, every limitation of the claim, and (2) be enabling thus placing the allegedly disclosed matter in the possession of the public.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Hence, under 35 U.S.C. §102, anticipation requires that each and every element of the claimed invention be disclosed in the prior art. *W.L. Gore & Assocs. v. Garlock, Inc.*, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Anticipation also requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 221 USPQ 481,

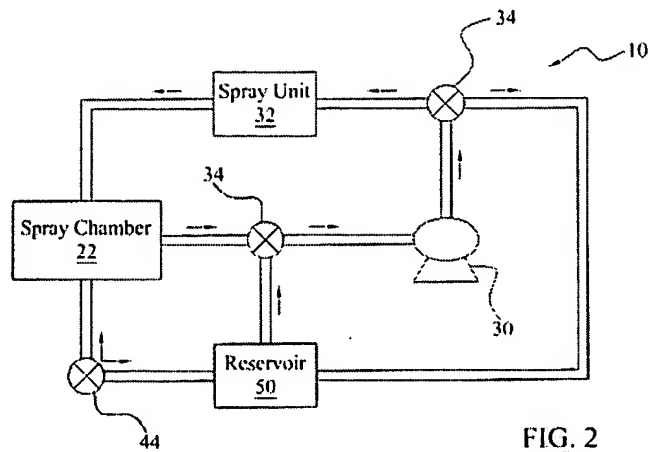
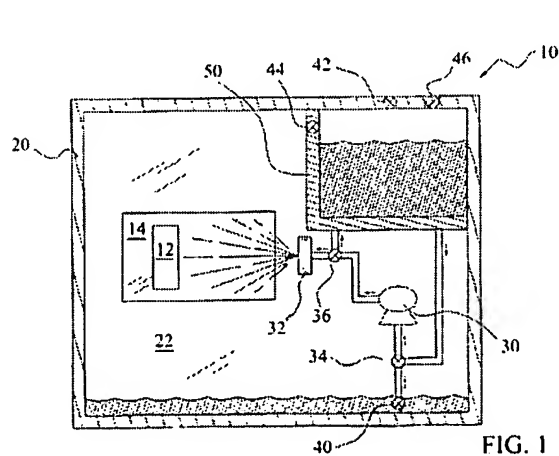
485 (Fed. Cir. 1984). In addition, the prior art reference must be enabling, thus placing the allegedly disclosed matter in the possession of the public. *Akzo N.V. v. United States Int'l Trade Comm'n*, 1 USPQ 2d 1241, 1245 (Fed. Cir. 1986), *cert. denied*, 482 U.S. 909 (1987) (emphasis added).

C. Present Invention.

Independent Claim 1 has the following features:

1. (Currently Amended) A spray coolant reservoir system, comprising:
 - a chassis having a spray chamber;
 - a spray unit within said spray chamber for dispensing coolant upon an item to be thermally managed;
 - a coolant system including a pump having an intake port and an output port, wherein said output port is fluidly connected to said spray unit, wherein said intake port of said pump is fluidly connected to said spray chamber, wherein said coolant system provides pressurized coolant to said spray unit;
 - a reservoir fluidly connected to said output port of said pump, wherein said reservoir is capable of storing a volume of coolant; and
 - a control system in communication with said coolant system and said reservoir for controlling a flow of coolant between said reservoir and said coolant system.

The essence of the invention claimed in independent Claim 1 is the unique connection of the output port of the pump (30) to both the spray unit (32) and the reservoir (50). An output valve (34) is capable of diverting the coolant flow to either the spray unit and/or the reservoir as required which *allows for the control of the internal pressure of the spray chamber (22)*. Figures 1 and 2 of the present application illustrate the features being claimed in independent Claim 1:



Figures 1 and 2 of the Present Application

Independent Claim 14 has the following features:

14. (Currently Amended) A method of operating a spray coolant reservoir system, said method comprising the steps of:

(a) drawing a first coolant flow from a spray chamber to provide a supply coolant flow to a spray unit positioned within said spray chamber; and

(b) **drawing a second coolant flow from a reservoir to provide said supply coolant flow to said spray unit only if said first coolant flow is hindered.**

Independent Claim 14 provides a unique coolant supply system for the pump by drawing upon the coolant contained within the spray chamber normally. However, when the coolant supply from the spray chamber is hindered in any way, the second coolant flow is drawn from the reservoir. This provides a constant supply of coolant to the pump which is important for the continuous and uninterrupted operation of the thermal management system.

D. Przilas (U.S. Patent No. 5,907,473).

Przilas teaches an “environmentally isolated enclosure for electronic components.” More particularly, Przilas teaches the usage of a “closed compartment (22)” containing electronic cards (32) with a plurality of spray nozzles (54) directing coolant at the cards. Przilas also teaches the usage of a pump (50) having an intake port fluidly apparently connected to both the interior of the closed compartment and a “fluid enclosure (46)” as shown in Figure 2 of Przilas illustrated below. However, the output port of the pump is solely connected to the spray manifold (53) as further illustrated in Figure 2 below.

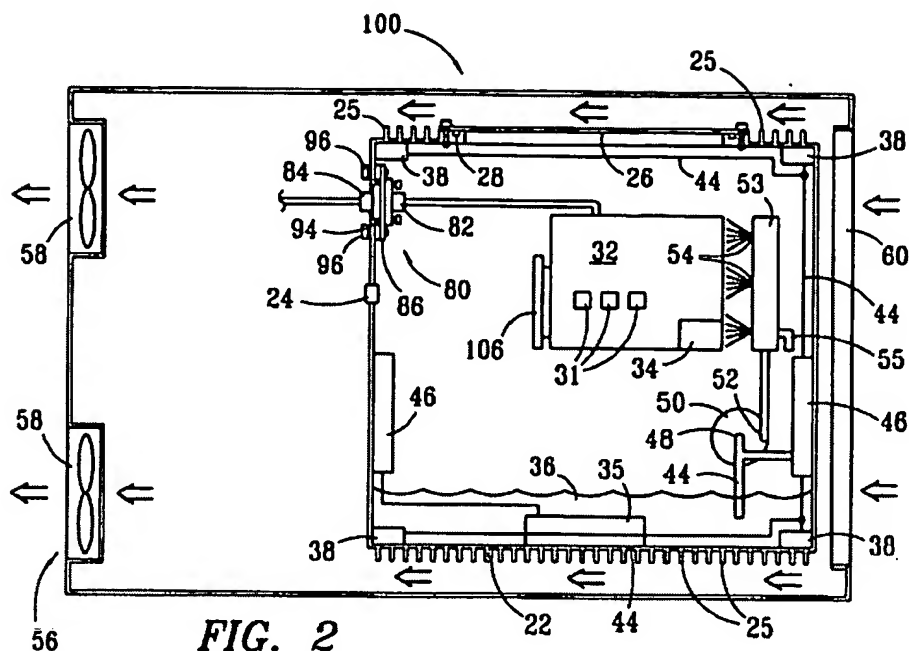


Figure 2 of Przilas (U.S. Patent No. 5,907,473)

Hence, Przilas does not teach “a reservoir fluidly connected to said output port of said pump” claimed as a feature of independent Claim 1. This structure in the present invention allows for selective filling of the reservoir as required to control the internal pressure.

In Przilas, the only supply of coolant for the fluid enclosure (46) are “[t]he collection modules 38 ... interconnected by tubes 44 to [the] fluid enclosure.” (Column 6, Lines 36-37.) Przilas further states that:

The fluid enclosure 46 is in fluid communication with an inlet 48 of a pump that has an outlet 52 in fluid communication with an array of nozzles 54 mounted to a spray manifold 53.

(Column 6, Lines 37-40.) There simply is no discussion, suggestion or support within Przilas for fluidly connecting a reservoir to an output of a pump.

The Office Action states that Przilas teaches “a control system (120, FIG. 3A) in communication with said coolant system and said reservoir for controlling a flow of coolant

between said reservoir and said coolant system.” (Office Action, Page 2; citing Column 6, Lines 29-35 of Przilas.) However, column 6 (lines 29-35) of Przilas merely discuss the “collection modules (38)” and “fluid sensors (47)” within the collection modules to ensure that the proper collection modules are opened/closed depending upon the orientation of the closed compartment (e.g. gravity or g-forces). In other words, Przilas merely teaches the controlling of coolant flow from the collection modules to the reservoir – not the coolant flow from the pump to the reservoir.

The Office Action further alleges that Przilas further teaches a first coolant flow from the spray chamber to the pump and a second coolant flow from the reservoir to the pump. (Office Action, Page 2.) The Official Action apparently relies solely upon the structure illustrated in Figure 2 of the drawings by stating the “tube (44) coming from the bottom of spray chamber (22), which bypasses the reservoir (46)” provides the first coolant flow.¹ However, there is no discussion in Przilas to support the position that the tube (44) “bypasses” the reservoir. Figure 2 of Przilas actually illustrates a tube (44) extending from the bottom of the spray chamber and then splits into both the inlet of the pump and the reservoir. In other words, the flow from the spray chamber and the reservoir actually “merge” together with no control as to whether the coolant comes from the spray chamber or the reservoir. There simply is no structure or functionality disclosed/suggested within Przilas relating to “*drawing a second coolant flow from a reservoir to provide said supply coolant flow to said spray unit only if said first coolant flow is hindered.*” (Claim 14.)

The Applicant respectfully submits that Przilas does not qualify as appropriate prior art under 35 U.S.C. §102(b) as Przilas does not disclose (expressly or inherently) all of the features of independent Claims 1, 14. Therefore, Applicant respectfully submits that independent Claims 1, 14 are patentable over the cited reference for at least these reasons. Accordingly, Applicant respectfully requests that the Examiner withdraw the outstanding rejection as applied to independent Claims 1, 14, since the application is in condition for allowance.

Paragraphs 3-4 of the Office Action

A. Overview.

The Official Action rejected Claims 2-7, 9, 15, 17 and 18 under 35 U.S.C. §103(a) as being unpatentable over Przilas (U.S. Patent No. 5,907,473). The Applicant respectfully disagrees with this rejection of these claims and also specifically incorporates the above-stated discussion into this section.

B. 35 U.S.C. §103(a).

In proceedings before the United States Patent and Trademark Office, the Examiner bears the burden of establishing a prima facie case of obviousness based upon the prior art. *In re Bell*, 26 USPQ2d 1529, 1530 (Fed. Cir. 1993). *In re Oetiker*, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). When references cited by the Examiner fail to establish a prima facie case of obviousness, the rejection is improper and will be overturned upon appeal. *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985).

“To establish a prima facie case of obviousness, three basic criteria must be met.” MPEP §706.02(j). First, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a **reasonable expectation of success**. Finally, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

¹ The Office Action identified Figure 1 as disclosing the subject matter. However, Figure 1 merely shows the external structure of the chassis (100) and not the internal components as discussed in the Office Action. The

The law regarding *obviousness* is clear -- any modification of the prior art must be suggested or motivated by the prior art. It is submitted that combining elements from different prior art references (in an attempt to establish obviousness) must be motivated or suggested by the prior art.

'Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined only if there is some suggestion or incentive to do so.' [citation omitted] Although couched in terms of combined teachings found in the prior art, the same inquiry must be carried out in the context of a purported obvious "modification" of the prior art. The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

In re Fritch, 972 F.2d 1260; 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992), (in part quoting from *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577; 221 USPQ 929, 933 (Fed. Cir. 1984)).

It is also submitted that the mere fact that one may argue that the prior art is capable of being modified to achieve a claimed structure does not by itself make the claimed structure obvious -- there must be a motivation provided by the prior art.

The examiner finds the claimed shape would have been obvious urging that (our emphasis) "it is obvious for one skilled in the art to form each hook base of any desired shape *** since *this is within the capabilities of such a person.*" Thus, the examiner equates that which is within the capabilities of one skilled in the art with obviousness. Such is not the law. There is nothing in the statutes or the case law which makes "that which is within the capabilities of one skilled in the art" synonymous with obviousness.

The examiner provides no reason why, absent the instant disclosure, one of ordinary skill in the art would be motivated to change the shape of the coil hooks of Hancock or the German patent and we can conceive of no reason.

Ex parte Gerlach and Woerner, 212 USPQ 471 (PTO Bd. App. 1980) (emphasis in original).

Applicant will assume the Office Action actually intended for Figure 2 to represent the internal structure as discussed.

C. The Office Action Provides No “Motivation” For Modifying Przilas.

The Office Action states that “*it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Przilas, by adding an intake valve and an output valve in order to recirculate the coolant in the system or fill up the reservoir as needed*.” (Office Action, Page 3.) However, the Office Action fails to provide any “reason why, absent the instant disclosure, one of ordinary skill in the art would be motivated to change” the coolant system of Przilas and the Applicant cannot conceive of a reason. *Ex parte Gerlach and Woerner*, 212 USPQ 471 (PTO Bd. App. 1980). “The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.” *In re Fritch*, 972 F.2d 1260; 23 USPQ2d 1780, 1783-84 (Fed. Cir. 1992).

The Office Action further states that “*Przilas also teaches the use of a chamber port (24 FIG. 2) for pressure equalization, except that the port bypasses the reservoir and connects the spray chamber to the ambient air.*” The Office Action further states that “*it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Przilas, by positioning the chamber port between the spray chamber and the reservoir in order to regulate the pressure relief when needed.*” First, Przilas merely teaches a “*pressure relief mechanism (24) sized to open or leak in the event the pressure within the closed compartment exceeds a predetermined value.*” (Column 4, Lines 18-21.) Hence, Przilas does not teach the active regulation of the pressure within the spray chamber – it merely prevents the pressure from exceeding a predetermined value. Second, there simply is no suggestion or motivation within Przilas to fluidly connect the reservoir with the spray chamber. The sole purpose of the “pressure relief mechanism” is simply to prevent over pressurization of the spray chamber – nothing more.

First, there is **no suggestion or motivation**, within Przilas itself or in the knowledge generally available to one of ordinary skill in the art, to modify Przilas as proposed in the Office Action. Second, there is **no reasonable expectation of success** since simply adding components/structure does not by itself provide the structure and functionality of the present

invention as claimed. Finally, Przilas does **not teach or suggest all the claim limitations** as discussed previously.

For these reasons, among others, Przilas cannot suggest the combination of features in applicant's Claims 2-7, 9, 15, 17 and 18, and it is therefore submitted that the rejection against these claims should be withdrawn and Claims 2-7, 9, 15, 17 and 18 allowed.

Paragraph 5 of the Office Action

The Official Action rejected Claims 2-5 under 35 U.S.C. §103(a) as being unpatentable over Przilas (U.S. Patent No. 5,907,473) in view of Hartness (U.S. Patent No. 4,857,090). The Applicant respectfully disagrees with this rejection of these claims and also specifically incorporates the above-stated discussion into this section.

The Office Action states that "*Hartness shows an intake valve (52, FIG. 2), fluidly connected to a spray chamber (46) and a reservoir (48), which controls whether the coolant stored in the reservoir is added to the coolant collected from the bottom of the spray chamber (34) and returned to the spray unit (30) to be old in the refrigeration art.*" (Office Action, Page 4.)

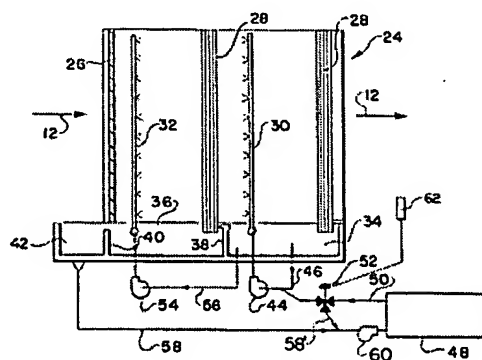


FIG. 2

Figure 2 of Hartness (U.S. Patent No. 4,857,090)

However, Hartness clearly does not illustrate the usage of intake valves for controlling the fluid flow from the spray chamber and the reservoir. The valve in Hartness merely controls the "quantity of chilled water which is supplied to the suction side of the first circulating pump 44."

(Column 5, Lines 9-12.) In addition, Hartness does not even relate to a spray cooling thermal management system where the internal pressure is important, much less where the internal pressure is regulated. In fact, the word “pressure” is not even used throughout the entire specification of Hartness.

Finally, Hartness is **not in the field of the inventor’s endeavor** and is **not reasonably pertinent to the particular problem** with which the present inventor was involved. *In re Wood*, 202 USPQ 171, 174 (C.C.P.A. 1979). The Applicant respectfully submits that Hartness is *non-analogous* to the present invention and should not be considered by the Examiner.

For these reasons, among others, the combination of Przilas with Hartness cannot suggest the combination of features in applicant’s Claims 2-5, and it is therefore submitted that the rejection against these claims should be withdrawn and Claims 2-5 allowed.

Paragraph 6 of the Office Action

The Official Action rejected Claims 8, 16 under 35 U.S.C. §103(a) as being unpatentable over Przilas (U.S. Patent No. 5,907,473) in view of Conklin (U.S. Patent No. 4,476,687). The Applicant respectfully disagrees with this rejection of these claims and also specifically incorporates the above-stated discussion into this section.

The Office Action states that “*Conklin shows an output valve diverting a coolant output flow back to a reservoir (col 4, lines 40-43) to be old in the refrigeration art.*” However, Conklin clearly does not illustrate the usage of an output valve to divert coolant output flow from a pump to a reservoir for the result of filling the reservoir. Conklin merely discusses the recirculating of a nonionic solution within a water supply tank and nothing more. In addition, Conklin does not even relate to a spray cooling thermal management system where the internal pressure is important, much less where the internal pressure is regulated.

Finally, Conklin is **not in the field of the inventor’s endeavor** and is **not reasonably pertinent to the particular problem** with which the present inventor was involved. *In re Wood*,

202 USPQ 171, 174 (C.C.P.A. 1979). The Applicant respectfully submits that Conklin is *non-analogous* to the present invention and should not be considered by the Examiner.

For these reasons, among others, the combination of Przilas with Conklin cannot suggest the combination of features in applicant's Claims 8, 16, and it is therefore submitted that the rejection against these claims should be withdrawn and Claims 8, 16 allowed.

Paragraph 7 of the Office Action

The Official Action rejected Claims 12, 13 under 35 U.S.C. §103(a) as being unpatentable over Przilas (U.S. Patent No. 5,907,473) in view of Miller (U.S. Patent No. 6,305,180). The Applicant respectfully disagrees with this rejection of these claims and also specifically incorporates the above-stated discussion into this section.

Miller merely discloses a "chiller unit" that provides cooled air into a modular electronic unit via the usage of a fan for cooling the electrical components within the modular electronic unit. Miller does not have a "reservoir" and does not require a reservoir since the water circulating within the chiller unit tubing is never exposed to evaporation since the water never makes contact with the electronic devices. In addition, Miller clearly teaches the usage of a constant chilled water supply.

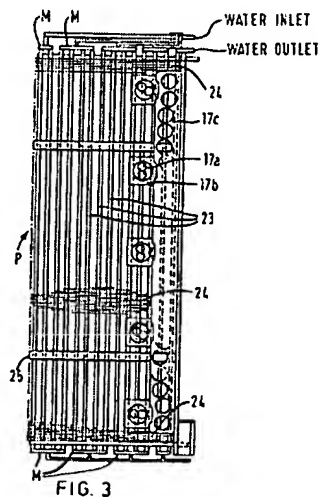


Figure 3 of Miller (U.S. Patent No. 6,305,180)

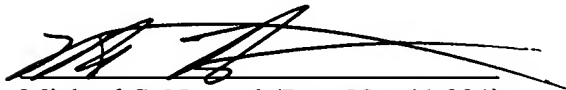
Finally, Miller is not in the field of the inventor's endeavor and is not reasonably pertinent to the particular problem with which the present inventor was involved. *In re Wood*, 202 USPQ 171, 174 (C.C.P.A. 1979). The Applicant respectfully submits that Miller is *non-analogous* to the present invention and should not be considered by the Examiner.

For these reasons, among others, the combination of Przilas with Miller cannot suggest the combination of features in applicant's Claims 12-13, and it is therefore submitted that the rejection against these claims should be withdrawn and Claims 12-13 allowed.

D. CONCLUSION

In light of the foregoing amendments and remarks, early reconsideration and allowance of this application are most courteously solicited. Should the Examiner consider necessary or desirable any formal changes anywhere in the specification, claims and/or drawing, then it is respectfully asked that such changes be made by Examiner's Amendment, if the Examiner feels this would facilitate passage of the case to issuance. Alternatively should the Examiner feel that a personal discussion might be helpful in advancing this case to allowance, they are invited to telephone the undersigned.

Respectfully submitted,



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